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AUTHOR Stephens, Charles E.
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ABSTRACT

Findings of a study focusing on cognitive and affective variables of one group of students who participated in the U.S. Office of Education funded project Interdisciplinary Model Program in the Arts for Children and Teachers (IMPACT) indicated that participation did not effect achievement test scores at grades four and six or teacher assigned grades at grade seven. The only difference between participants and nonparticipants on an affective measure was in perception of teacher control. Academic achievement data were collected at grades four, six, and seven and affective data at grade 7. The affective instrument was designed to measure attitude toward school and the arts. (RC)

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Cognitive and Affective Evaluation of an Arts Related Program

Charles E. Stephens
Research Design Specialist
School District 4J
Eugene, Oregon

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Cognitive and Affective Evaluation of an

Arts Related Program

Introduction

For the school years 1970 and 1971, this school district was one of five districts nationally that received a grant from the United States Office of Education as part of an Interdisciplinary Model Program in the Arts for Children and Teachers - IMPACT (1973). The local project received $100,000 a year for each of two years. In this district the objectives were teacher oriented and focused on bringing about structural and administrative changes in a school, retraining of teachers, and obtaining parity for the arts with the cognitive aspects of an elementary school program. The evaluation of the five national IMPACT projects was the responsibility of a team from Pennsylvania State University. Ten percent ($20,000) of the local project budget was paid to the contractor for an evaluation. The contracted evaluation focused on teacher variables and essentially avoided the question of IMPACT's effect on students.

The data reported in this document were the result of an independent investigator's interest in the effect of IMPACT on student academic achievement and attitude toward school and the arts. The effect of this IMPACT program on teachers and changes in school climate have been reported by Reynolds (1973) and by the final report of the IMPACT evaluation team.

Hypotheses

The two major hypotheses tested by this study were: (a) there would be no changes in academic achievement between students who attended the IMPACT school prior to the implementation of IMPACT and students who had participated in IMPACT; and (b) there would be no difference in the attitude toward school and the arts of students who participated in IMPACT and those who had not.

Procedures

Achievement data from the Stanford Achievement Test, Form W (word meaning, paragraph meaning, spelling, arithmetic concepts, and arithmetic application sections) were available for the years 1969 and 1970, and the instrument was administered for the years 1971 and 1972. Thus, comparable data were available on groups of fourth and sixth grade students who enrolled in the IMPACT school for the years 1969, 1970 (baseline years) and 1971, 1972 (IMPACT) years. The Intermediate I Battery of the Stanford Achievement Test was administered to fourth grade students while the sixth grade students were administered the Intermediate II Battery. All achievement data were collected during October of the respective years. At seventh grade two cognitive measures were used to compare those students who had participated in IMPACT with those who had not. The first of these was the total Intelligence Quotient score (October test administration) from Form S of the 1963 edition of the California Short-Form Test of Mental Maturity. Second was the grade

point average based on teacher assigned grades for the first and second semesters of the school year. These data were compared respectively through the use of ANOVA.

Attitude toward school and arts was assessed by collecting data at grade seven from four groups of students who had participated in: Group 1 - (IMPACT) for a full year; Group 2 - (SPIN-OFF), a program that benefited from the spin-off effect of IMPACT; Group 3 - (REGULAR), an elementary school program not affected by IMPACT, but whose students attended the same junior high school as Groups 1 and 2; and Group 4 - (COMPARISON), a random sample of seventh grade students whose elementary schools had not been involved with IMPACT.

The COMPARISON group attended a junior high several miles distant from the one attended by Groups 1, 2, and 3. The first three groups of students attended a junior high school located in an area of the community with a mean income level of $15,666 (1970 census). The comparison groups were enrolled in a junior high school located in an area with a mean income level of $10,766 (1970 census).

The 44-item attitude scale was similar to ones used by Fosmire (1971) and Stephens (1972) with senior and junior high school students respectively. In this response format the respondent indicates his perception of the frequency of the occurrence of the event described by the item and then indicates the degree to which he would like the event to occur (i.e. more frequently, stay the same, or less frequently). The data reported in this paper are limited to the respondent's perception

of the occurrence of an event.

The instrument was developed using attitude toward school items previously used by the author, and a series of items dealing with attitude toward the arts. Attitude toward the arts items were developed from information provided through interview with members of the IMPACT staff as they speculated on the long term benefits of student participation in the project. The items thus generated were placed in the same format as the attitude toward school items previously field tested by Stephens (1972). The complete set of items were reviewed by a portion of the IMPACT staff to determine if the staff viewed the items as being directly related to the benefits of participation in the program. Minor adjustments in wording followed this review.

Early in October the set of 44 attitude items was administered to the entire seventh grade class of a junior high school. Two hundred two students completed all 44 items. The resultant scores were factor analyzed with five factors identified. These factors were: F-1, peer support; F-2, student-teacher cooperation; F-3, peer respect; F-4, general satisfaction with school; and F-5, negatively directed teacher control. A listing of items by factor is contained in the appendix.

Data collection with the affective measure took place in October, March, and May of the participants' seventh grade year. Statistical analysis of the affective data used ANOVA for repeated measures on the same individuals. Input data for the analyses were individual factor scores derived from the factor analysis. Criteria for inclusion in

this portion of the data analysis were enrollment in the schools represented by Groups 1, 2, and 3 for one year prior to entering seventh grade and completion of the affective instrument at each of the three data collection points. Students in Group 4 met the criterion of completing the 44-item instrument.

Findings

Analysis of the cognitive data for grades four, six, and seven is presented first, followed by the analysis of the affective data.

Table 1 contains a summary of the cognitive data for all fourth grade students enrolled in the IMPACT school for the baseline years of 1969-1970 and project effect years of 1971-1972. This table shows, in grade equivalent scores, the group means and standard deviations, number of students, and F-ratio resulting from the ANOVAs for the five cognitive measures that were extracted from the Stanford Achievement Test Battery.

At grade four, statistically significant ($p < .05$) differences were found across the four-year time span for the tests of word meaning and arithmetic concepts. The three achievement measures, paragraph meaning, spelling, and arithmetic application, did not yield significant differences. The significant differences on word meaning may be related to a low set of scores for the 1969 baseline year. Wide variation in the mean scores for arithmetic concepts may be due to student differences, teaching technique, total program variables, or chance,

and may not be related to participation in IMPACT.

Table 2 contains a summary of the cognitive data for all sixth grade students enrolled in the IMPACT school for the baseline years 1969-1970 and project effect years 1971-1972. The same type data are presented as for Table 1. At grade six no statistically significant differences ($p < .05$) were found across the four-year span on any of the five achievement measures.

Table 3 contains a summary of the cognitive measures collected from members of Groups 1 (IMPACT), 2 (SPIN-OFF), and 3 (REGULAR) during their seventh grade year. This table shows the group mean intelligence quotient and standard deviation from the California Short-Form Test of Mental Maturity (CTMM) administered in October of the seventh grade year, first and second semester grade point average (gpa), and F-ratio resulting from the respective ANOVAs. No statistically significant differences were found between the three groups on these cognitive measures.

Based on these data it appears that group involvement in the IMPACT program had essentially no measurable effect on the cognitive variables as measured by the word meaning, paragraph meaning, spelling, arithmetic concepts or arithmetic application sections of the Stanford Achievement Battery. Furthermore, no statistically significant differences were found between the group intelligence quotients or grade point averages for the three groups during their seventh grade year.

Three sets of analyses were conducted with the affective data. These were: (a) a comparison, by factor, in October and again in May to

Table 1

Summary of Fourth Grade Cognitive Measures from the Stanford Achievement Test, in Grade Equivalent Score Form, for the IMPACT School

Measure		Year 1969	1970	1971	1972	F Ratio
Word	$\bar{X}$	4.18	4.67	4.82	4.47	2.79*
Meaning	SD	1.52	1.47	1.62	1.50	
	N	91	88	82	70	
Paragraph	$\bar{X}$	4.38	4.49	4.49	4.47	.17
Meaning	SD	1.63	1.44	1.44	1.58	
	N	91	86	82	71	
Spelling	$\bar{X}$	3.91	4.16	3.99	4.09	.55
	SD	1.38	1.34	1.33	1.34	
	N	92	86	80	71	
Arithmetic	$\bar{X}$	3.80	4.38	4.61	3.97	5.52*
Concepts	SD	1.31	1.41	1.55	1.49	
	N	92	83	82	73	
Arithmetic	$\bar{X}$	4.22	4.64	4.65	4.39	1.93
Application	SD	1.19	1.43	1.45	1.24	
	N	91	83	81	73	

*$p < .05$

Table 2

Summary of Sixth Grade Cognitive Measures from the Stanford Achievement Test, in Grade Equivalent Score Form, for the IMPACT School

Measure		Year 1969	1970	1971	1972	F Ratio
Word	$\bar{X}$	6.06	6.46	6.09	6.28	1.10
Meaning	SD	1.51	1.57	1.49	1.55	
	N	82	69	81	81	
Paragraph	$\bar{X}$	6.58	6.79	6.33	6.70	.84
Meaning	SD	1.58	1.96	1.84	2.03	
	N	82	69	83	80	
Spelling	$\bar{X}$	5.99	5.98	5.58	5.98	.89
	SD	1.89	2.16	1.73	2.04	
	N	82	64	86	81	
Arithmetic	$\bar{X}$	6.45	6.34	6.11	6.23	1.04
Concepts	SD	1.17	1.47	1.13	1.27	
	N	82	68	84	80	
Arithmetic	$\bar{X}$	6.87	6.81	6.26	6.74	1.89
Application	SD	2.08	2.28	1.74	2.00	
	N	82	68	84	80	

Table 3

Summary of Seventh Grade Cognitive Measures

Measure		Group IMPACT	SPIN-OFF	REGULAR	F Ratio
CTMM	$\bar{X}$	117	117	117	.008
	SD	10.5	16.0	14.0	
	N	47	47	15	
GPA					
Semester 1	$\bar{X}$	3.07	2.84	2.88	1.67
	SD	.63	.65	.86	
	N	47	49	19	
Semester 2	$\bar{X}$	3.04	2.90	2.90	.54
	SD	.58	.70	.70	
	N	47	49	19	

determine if there were differences between the four groups at the beginning and ending of the seventh grade; (b) a comparison, by factor, between IMPACT and SPIN-OFF to utilize the large N provided by these groups; and (c) a comparison, by factor, between the IMPACT, SPIN-OFF, and REGULAR groups.

Table 4 presents df and F-ratios for the ANOVAs by factor from the comparison of the October and May administrations of the affective measure to the IMPACT, SPIN-OFF, REGULAR and COMPARISON groups. The October data yielded no statistically significant differences on any of the five factors. An analysis based on the data from May showed a statistically significant difference ($p < .05$) on Factor Five (F-5). The mean factor score on F-5 for the COMPARISON group was higher than for the other three groups. This finding could indicate that the students in the COMPARISON group viewed teachers as having more negatively oriented control over students than did the students enrolled in the other junior high school.

Table 5 presents summaries of the ANOVAs, by factor, for the comparisons of the scores from the three administrations of the affective instrument to the students who met the criteria for inclusion in the IMPACT and SPIN-OFF groups. The separate analysis between these two groups was conducted to maximize the number of cases available (N=47 for each group).

No statistically significant differences were found for Factors

Table 4

Analysis of Variance Across Four Program Types, by Factor, for October and May Administration of the Affective Measure

Factor	October		May	
	df	F	df	F
1. Peer Support	3,132	2.54	3,133	.38
2. Student Teacher Cooperation	3,132	1.01	3,133	2.12
3. Peer Respect	3,132	1.20	3,133	.85
4. General Satisfaction	3,132	1.31	3,133	1.48
5. Teacher Control (-)	3,132	2.66	3,133	2.96*

*$p < .05$

Table 5

Analysis of Variance Across IMPACT and SPIN-OFF Groups, by Factor, for the October, March, and May Administrations of the Affective Measure

Factor	Source of Variation	df	MS	F	
	Between school (A)	1	.53	.32	
	Error	92	1.67		
F-1	Within school (B)	2	.58	1.81	
	AB	2	.04	.13	
	Error	184	.32		
	Between school (A)	1	6.24	3.78	
	Error	92	1.65		
F-2	Within school (B)	2	1.32	4.13	$p < .05$
	AB	2	.21	.66	
	Error	184	.32		
	Between school (A)	1	.17	.15	
	Error	92	1.15		
F-3	Within school (B)	2	.01	.04	
	AB	2	1.44	5.14	$p < .05$
	Error	184	.28		

(continued)

Factor	Source of Variation	df	MS	F	
	Between school (A)	1	1.94	1.40	
	Error	92	1.39		
F-4	Within school (B)	2	.84	2.71	
	AB	2	.04	.13	
	Error	184	.31		
	Between school (A)	1	5.95	5.89	$p < .05$
	Error	92	1.01		
F-5	Within school (B)	2	.27	.73	
	AB	2	1.01	2.73	
	Error	184	.37		

One and Four. A significant difference was found for Factor Two (F-2, student-teacher cooperation). On this factor the SPIN-OFF group showed a greater decline in perceived student-teacher cooperation over the duration of the school year than did the IMPACT group. However, the scores on this variable decreased for both groups from the October and May data collections.

Factor Three (F-3, peer respect) showed a significant interaction effect. The mean score of the IMPACT group declining between October and May, while the SPIN-OFF group increased their score from October to May. Factor Five (F-5, teacher control [-]) produced a statistically significant difference between the two groups. In this case, the mean factor scores were far apart in October, indicating that the two groups viewed negative teacher control differently. By May the scores from IMPACT had declined and those from SPIN-OFF increased so that both groups scored at virtually the same point.

With all three statistical significant findings the scores of the IMPACT and SPIN-OFF groups moved closer together in May than they were in October. Possibly participation in a common school program is more closely related to student perception of events than the arts orientation of their respective elementary school programs.

The third series of analyses, by factor, (shown in Table 6) are based on data from the IMPACT, SPIN-OFF, and REGULAR groups.

Table 6

Analysis of Variance Across IMPACT, SPIN-OFF, and REGULAR Groups, by Factor, for the October, March, and May Administrations of the Affective Measure

Factor	Source of Variation	df	MS	F
	Between school (A)	2	2.89	1.84
	Error	54	1.57	
F-1	Within school (B)	2	.18	.67
	AB	4	.06	.22
	Error	108	.27	
	Between school (A)	2	.26	.15
	Error	54	1.69	
F-2	Within school (B)	2	.77	2.48
	AB	4	.22	.71
	Error	108	.31	
	Between school (A)	2	.19	.13
	Error	54	1.47	
F-3	Within school (B)	2	.14	.48
	AB	4	.69	2.38
	Error	108	.29	

(continued)

Factor	Source of Variation	df	MS	F	
	Between school (A)	2	.17	.09	
	Error	54	1.79		
F-4	Within school (B)	2	1.41	4.27	$p < .05$
	AB	4	.39	1.18	
	Error	108	.33		
	Between school (A)	2	3.86	3.16	$p < .05$
	Error	54	1.22		
F-5	Within school (B)	2	.44	1.13	
	AB	4	1.04	2.67	$p < .05$
	Error	108	.39		

The REGULAR group contained a maximum of 19 students that met the criteria for inclusion. Thus students from IMPACT and SPIN-OFF groups were randomly selected to equalize the N for purposes of analysis. No significant differences were found on Factor One, Factor Two, or Factor Three. A statistically significant difference was found for Factor Four (F-4, general satisfaction with school). This finding indicated that in May the REGULAR group may have been better satisfied with school than the other two groups.

Factor Five (F-5, teacher control [-]) yielded a significant difference between the groups and an interaction effect. The SPIN-OFF group consistently perceived less negative teacher control than did the other two groups. The interaction effect was due to a continuous decline, over the year, in the IMPACT group's perception of negative teacher control.

Conclusions

These data indicate that participation in IMPACT did not affect academic achievement as measured by standardized achievement tests or as manifested through teacher assigned grades. The IMPACT group showed a decline in their perception of negative teacher control during the year to a greater degree than the other groups. The shift in perception may have been due to the realization that junior high teachers were not as controlling as expected. This possibility is substantiated by the fact that the SPIN-OFF group's perception of negative teacher control changed very little or increased during the year.

Based on the data examined in the study, it appears that IMPACT had little effect on students' cognitive and affective development. But is that a valid statement or a symptom of the syndrome that calls for all enrichment programs to produce easily measured changes in student behavior? Is it not feasible for an enrichment program to be sold on its own merits? What is wrong with art for the sake of art?

Appendix

Items by Factor

FACTOR 1

Peer Support

Students help one another understand the materials presented in class.

When a newcomer enters this school other students are quite willing to accept him.

Students in this school are more interested in participating in the arts rather than in reading about them.

Estimate the chance that in an activity group the goals and projects of the group are set by the students alone.

Students who are outstanding in an art area (music, art, dance, drama) are admired by their fellow students.

If a student thinks out a report carefully, teachers will give him a good grade even if they don't agree with him.

Students who are outstanding athletes in this school are admired by their fellow students.

If a student were teased to a point of anger or tears, he would get help from some other students.

Estimate the chance that in an activity group the goals and projects of the group are set by the students and teachers together.

Teachers restate and ask questions until they are sure they understand what students are saying.

Adults and students in this school appreciate differences in people.

This school places importance on competition among students.

When a student presents an idea no one responds.

FACTOR 2

Student Teacher Cooperation

Students feel that the arts (music, drama, dance, art) should be an important part of the day.

In order to find out how things are going in the classroom, a teacher would use a questionnaire.

Estimate the chance that if a group of students want to organize an after-school activity, such as pottery making, they would get support from the teachers.

If a student is in need of special help, teachers are available outside of class (before or after school, at lunch, or planning period).

Students feel that a variety of interesting dance opportunities are available at this school.

Students are encouraged to help decide what will be covered in a class.

Estimate the chance that if a group of students want to organize an after-school activity, such as golf, they would get support from the teachers.

Students feel that a variety of interesting visual arts opportunities are available in art or other classes.

In order to find out how things are going in the classroom a teacher would hold a free and open discussion with the students.

Students at this school get to see artists at work in a number of different art areas.

Students feel that a variety of interesting drama opportunities are available at this school.

Students are encouraged to help decide how the class will be taught.

FACTOR 3

Peer Respect

The students in this school treat each other with courtesy and respect.

Students feel responsibility for making class worthwhile and interesting.

Estimate the chance that an activity group will be formed or abolished by a group of interested students.

Students feel that a variety of interesting music opportunities are available in music or other classes.

In a class students take responsibility for changing things that seem to make some students feel insecure, put-down, or useless.

Students say nothing in class unless called upon.

FACTOR 4

General Satisfaction

If assignments are not clear, the teachers don't mind answering all the questions that students want to ask.

If students do their work well, they get a good grade whether or not the teachers like them.

The students in this school prefer assignments that have no right or wrong answer.

This school is an attractive place to work.

The students in this school feel comfortable in new situations.

Classes in the arts (music, drama, dance, visual arts) that the students want are offered.

Overall, students are satisfied with this school.

FACTOR 5

Teacher Control (negative)

When a student expresses anger with one teacher the other teachers soon know about it.

Teachers treat questions in class as if the students were criticizing them personally.

Teachers make students feel like children.

Estimate the chance that in an activity group the goals and projects of the group are set by the teachers alone.

The student who differs from the crowd in this school finds that most students tend to ignore or reject him for being different.

Estimate the chance that an activity group will be formed or abolished by teachers only.

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